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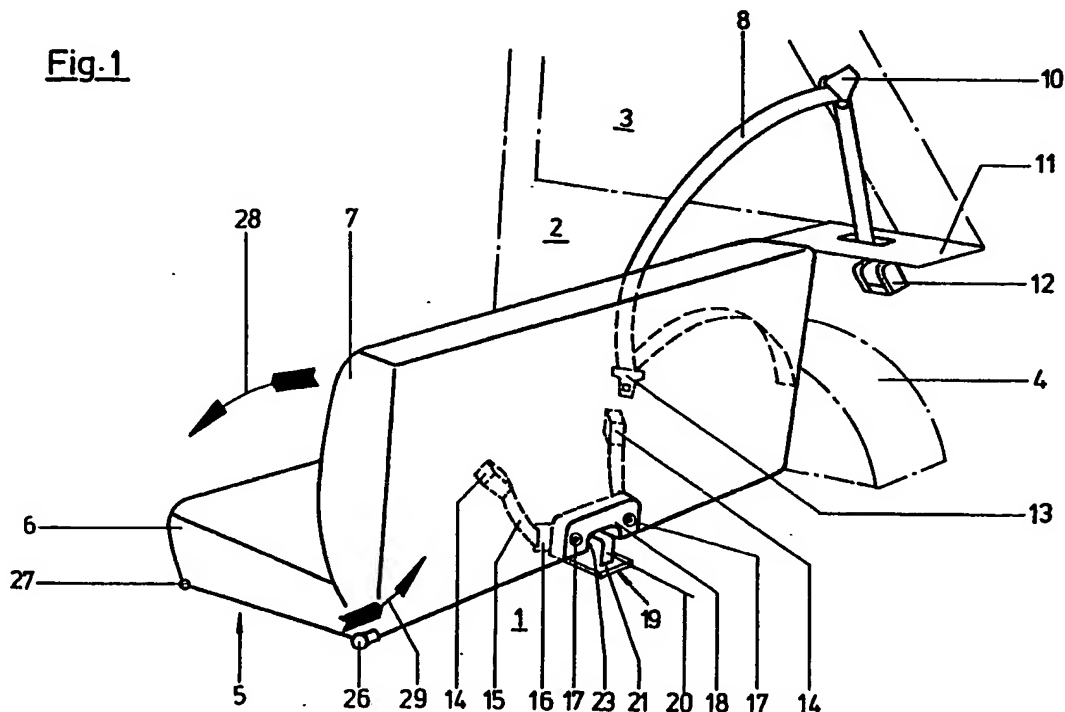
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(54) Arrangement for anchoring seat belts in relation to folding seats in vehicles

(57) An arrangement for anchoring a seat belt buckle (14) in relation to a folding seat (5) in a vehicle, in which the belt buckle (14) is connected by a strap (15) or other means to a snap lock (18) secured to the rear of the backrest (7) of the seat (5), the snap lock (18) being releasably engageable with a floor anchorage point (19) having a bracket (20) which engages the snap lock (18).

Fig.1



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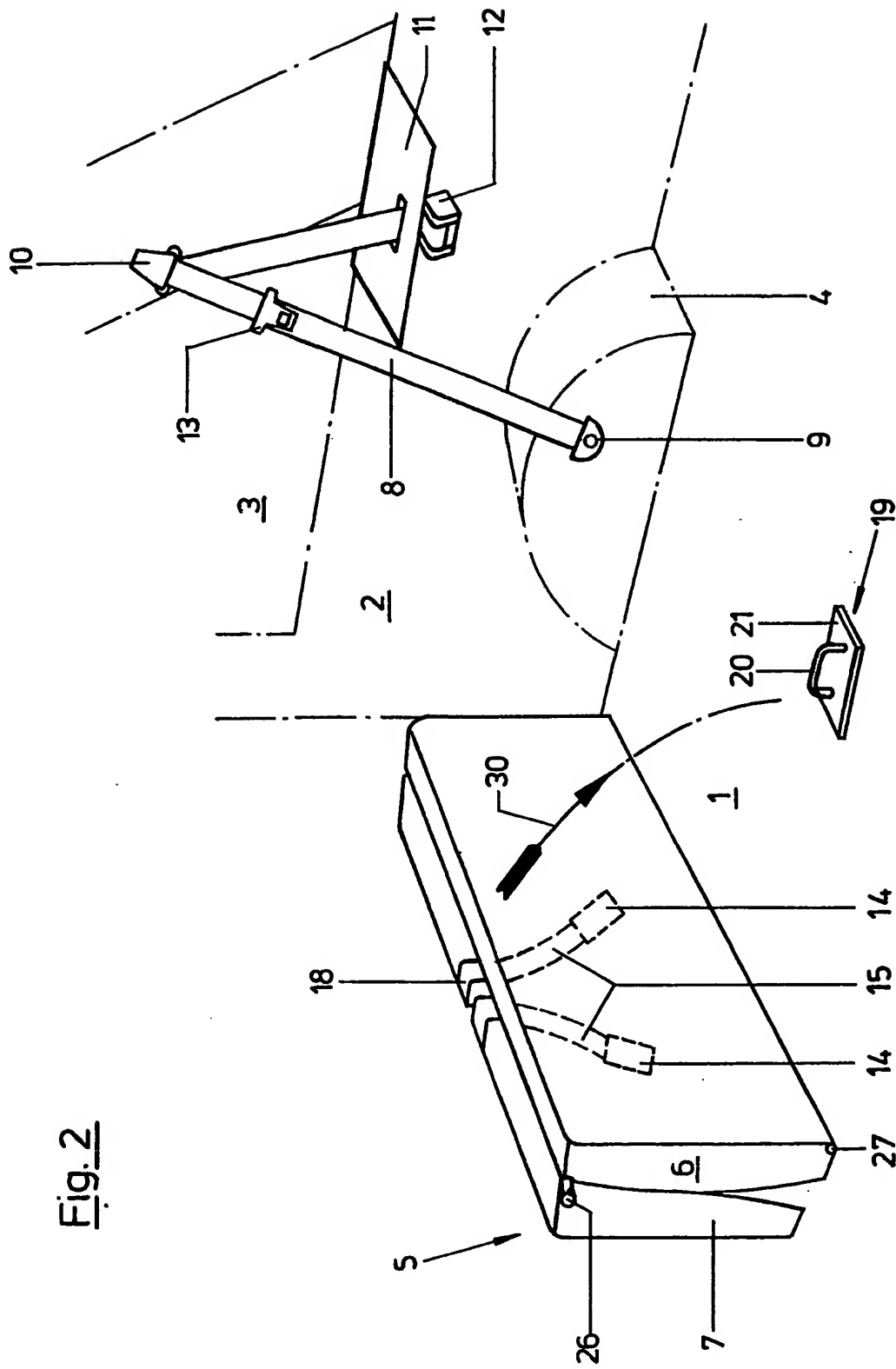
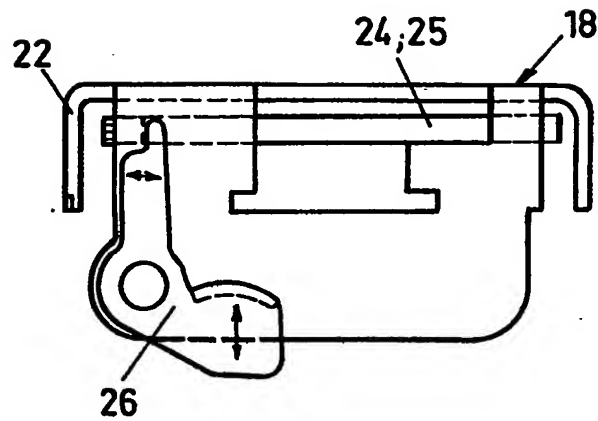
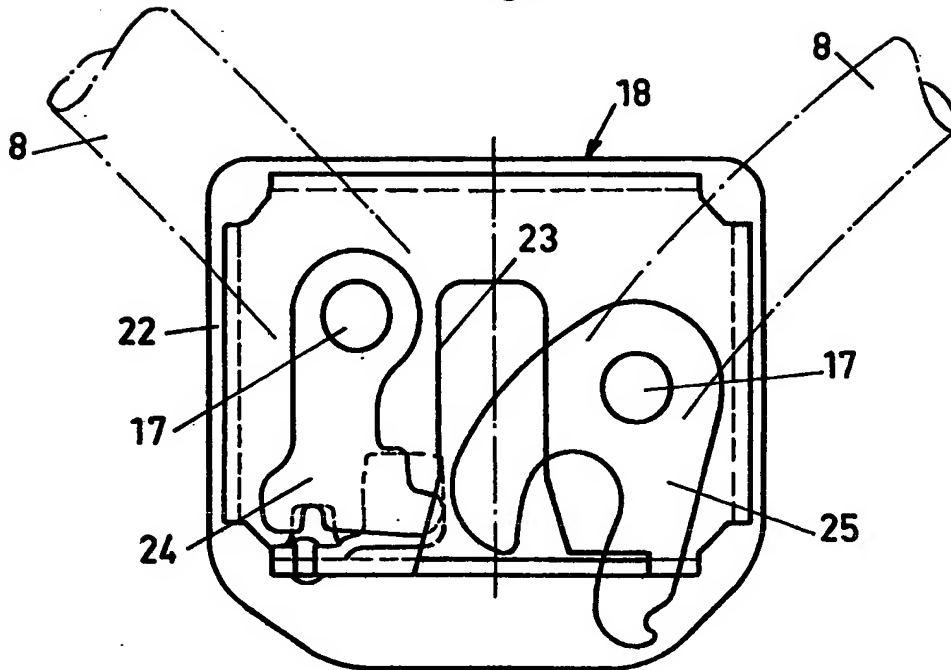


Fig. 2

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Fig.3Fig.4

## SPECIFICATION

## Arrangement for anchoring seat belts in relation to folding seats in vehicles

The invention relates to an arrangement for anchoring a seat belt in relation to a folding seat in a vehicle, having an anchorage point secured to the floor of the vehicle.

Widely varying kinds of belt systems are known in motor vehicles, which, to enhance the safety of the occupants of the vehicle, are fitted around the occupants before the vehicle begins to move and, at the moment of an accident, restrain the occupants to prevent them from striking against parts of the vehicle. For that purpose, the belts must be mounted in anchorage points which are securely fixed to the vehicle frame structure or chassis. Known systems are the three-point belt fixings which are frequently used at the present time and in which there are three anchorage points, so arranged that the belt forms a lap belt and a shoulder belt. In such three-point systems, an anchorage point is generally disposed on the floor or frame structure of the vehicle, at the side of the vehicle at a downward outward position, while a second anchorage point, a guide fitment or a fixedly anchored belt winding device is mounted approximately in the vertical region above the first-mentioned anchorage point, also on the vehicle frame structure, on the outer wall portion thereof. Both when the system uses a belt winding device and also a fixed anchorage point, above the first-mentioned bottom anchorage point, a third anchorage point is provided on the opposite side of the seat, generally in the middle of the vehicle, on the floor thereof; the belt lock or buckle into which the buckle tongue member is inserted when strapping the belt in position is connected to the third anchorage point generally directly by screwing or by way of an anchor cable or a short portion of belt.

The anchorage point for the belt buckle, which is generally mounted to the floor of the vehicle at the centre thereof does not give rise to any problems, either from the technical safety aspect or from the technical manufacturing aspect, in the case of four-door private cars, because there is space available at that central anchorage point for fixedly mounting components which can be subjected to a high loading, and that arrangement never gives any problem in operation.

However, the situation is different in the case of folding seats, for example in two-door cars, in the region of the front seat, in station waggons, buses, vans, truck cabs and the like, where for example the rear seat or the entire rear bench seat must be folded down and folded away, in order to increase the load-carrying area, so that in that case the central anchorage point with the belt buckle mounted thereto (or, in the case of two seats arranged side-by-side: the two belt buckles) lies in the way freely on the floor of the vehicle.

In order to eliminate that disadvantage and to achieve the aim of keeping the floor of the vehicle free of seat belts and anchorage points, the

arrangement has already been adopted, of moving the central belt anchorage into the seat. However, when using such constructions, it is necessary to accept that the structure of the entire seat is provided with such strong and accordingly cost-intensive components that the forces and loadings which occur in an accident and which are transmitted to the anchorage point by the belt by way of the belt buckle can be fully carried by the seat, because if that were not the case, the belt fastening would be torn out of the seat. However, building such a strong and stable seat is not only expensive but also a cumbersome and complicated operation, from the technical point of view.

The present invention therefore aims to improve the anchorage arrangement of the kind set forth in the opening part of this specification, such that the central anchorage point for the belt buckles can be made sufficiently strong and stable, using simple means, without the seat having to be provided with accessory structures which give rise to levels of cost and technical construction expenditure which are not economically viable.

According to the present invention there is provided an arrangement for anchoring a seat belt in relation to a folding seat in a vehicle, having an anchorage point secured to the floor of the vehicle, in which the floor anchorage point has a locking bracket to which a snap lock secured to the folding seat is releasably connected, and the belt fixing is mounted to the snap lock.

In this way, the safety belts or the belt buckles can be mounted directly to a seat of normal construction which is comparatively light and inexpensive to construct, like seat constructions without having regard to a safety belt system. However, the belt buckles are not secured directly to the seat frame without further means, but to a snap lock so that, without a mounting for the snap lock, in theory, the belt buckles together with the snap lock could be torn out of the seat upon the application of substantial forces. However, in accordance with the invention, for securely anchoring the buckles and for preventing the buckles from being torn out of the seat, there is a connection between the snap lock and a locking bracket or loop member, the bracket or loop member being firmly anchored to the floor of the vehicle. When using the safety belt system according to the invention, when the backrest of the seat is set up, the snap lock is automatically connected to the locking bracket or loop member so that there is no longer any possibility of the belt buckles being torn out of the seat. More specifically, anchoring of the belt buckles by way of the snap lock and the locking bracket can be effected using simple means and independently of the construction of the entire folding seat, in such a firm fashion that the tensile forces which are applied in an accident by way of the belts, the catch tongue member and the belt buckle cannot cause the snap lock to be torn out of the locking bracket or loop member, nor can they cause the locking bracket or loop member to be torn out of

the vehicle floor.

Therefore, in accordance with the invention, it is advantageously possible to retain the folding seats of comparatively light construction, and to secure the belt buckles, with the snap lock, on the seat, while the high forces at the moment of an accident taking place are carried by way of an additional anchoring means, namely, between the locking bracket and the snap lock, that is to say, a high-strength catch pawl or latch. It will be appreciated that the belts, the belt buckles and possibly the anchorage cables or additional belt portions thereof are sufficiently firmly mounted to the snap lock in per se known manner, possibly using sufficiently strong screws, so that all forces which occur in an accident are reliably transmitted to the locking bracket at the anchorage point and thus to the floor of the vehicle or the body portions thereof. In this connection, it will be appreciated that the axes of the catch pawls in the snap lock and also the locking bracket are sufficiently strong and sturdy.

In another advantageous embodiment of the invention, it is desirable for the snap lock to be mounted on the side of the folding seat, which is in the region of the centre of the vehicle, in the backrest of the seat. In most folding seat arrangements, the backrest is turned or folded about a pivot axis between the backrest and the seat portion so that the snap lock should desirably be disposed in the region of the backrest pivot axis, that is to say, in the lower region of the backrest. More specifically, the most suitable anchorage point is to be found there, if the direction of forces in an accident is considered and if the avoidance of injury to the occupant of the vehicle is borne in mind. In that case, more specifically, the belt buckle can be disposed in the vicinity of the backrest pivot axis, in the region of the centre of the vehicle, thereby advantageously preventing the body of the occupant of the vehicle from sliding through the lap belt. Nonetheless however, the advantages that this invention seeks to attain can be fully achieved because the anchorage point for releasably connecting the snap lock can be mounted as desired. More particularly, the locking bracket or loop member is generally of such a small nature that it does not represent any impediment in the entry or loading space, when the folding seat is tipped up, when the bracket or loop member projects out of the floor of the vehicle. In accordance with the invention however, it is particularly advantageous if in addition the locking bracket or loop member is also sunk in the floor of the vehicle. Constructions of that kind have long been known per se, if for example consideration is given to the engine bonnet locking arrangement in motor vehicles. In that case, the uppermost part of the locking bracket lies flush in the plane of the floor of the vehicle. The actual anchorage point is then so-to-speak sunk down in the floor.

Depending on the construction of the folding seat and the conditions for mounting the belt buckles, it may also be advantageous, in

accordance with the invention, for a connecting belt or cable to be provided between the belt buckle and the snap lock. A connection of that kind between an anchorage point and belt buckle is already to be found, in itself, in some belt systems. In accordance with the invention however, the advantage here is that the transitional members and the options of adjustment are also possible when using the features according to the invention, that is to say, in spite of the presence of a snap lock which can be latched into engagement with the anchorage point and which is fixed in the lower part of the backrest of the folding seat.

It will be appreciated that a lever may be provided on the snap lock so that, after the snap lock has been engaged and automatically latched closed to the locking bracket of the anchorage point, release thereof is possible if for example the folding seat is to be moved from the operative position into a rest or loading position.

Instead of securing a snap lock to a side of a vehicle seat, which is towards the centre of the vehicle, the features according to the invention may also be used in relation to bench seats. In that case, the snap lock is mounted in the centre of a bench seat, and once again, in the region of the backrest pivot axis. The remaining features are in this case the same as those described above; except that in addition there is the advantageous possibility of providing only a single snap lock with a single anchorage point with locking bracket or loop member, for both three-point belts for the two occupants of the vehicle, who are sitting on the bench seat, because both belt buckles can be mounted to the same snap lock which is then to be of a somewhat stronger construction. In this connection however, the possibility should not be excluded that two anchorage points or an anchorage point with two locking brackets and two snap locks can also be used, in relation to a bench seat.

Therefore, by virtue of the features according to the invention, the central anchorage point can be secured to and moved with a normal seat of light construction, because the fixing is by way of a snap lock which can be connected to the anchorage point and which is capable in the event of an accident of transmitting all forces directly to the anchorage point on the floor of the vehicle. Fitting the safety belt system with those features is particularly simple because the anchorage point with locking bracket or loop member can be conveniently secured by simple means to the vehicle chassis at the correct position thereon. The transmission system for transmitting the high forces which occur in an accident is very simple, in the case of the present invention, for the preferred embodiment illustrated only requires latching pawls and a locking bracket or loop member, without having to provide further and expensive connecting systems. When the folding seat is folded together and pivoted up, that is to say, the snap lock is released from the anchorage point by a push button or rotary lever, the floor area of the

vehicle is completely free and flat so that in the case either the vehicles can be easily entered by occupants or, in the case of commercial vehicles, a smooth loading area can be provided.

5 The features according to the invention are particularly advantageous when used in commercial vehicles, for example vehicles for personnel transportation, when seats are folded forward to permit people to enter or pass through, 10 for example in taxis, buses or dual-purpose vehicles acting as a bus and as a light truck. The construction according to the invention is also particularly advantageous in relation to motor caravans or vehicles having a sleeping cabin, 15 when the seat must be folded away in order to set up the sleeping arrangements. It may also be desirable in regard to other commercial vehicles to provide seats which can be folded away but which are provided with completely secure seat belt 20 systems. For example, vehicles frequently have emergency seats which are folded away in normal operation, but which, for use, should be provided with a seat belt system that is just as safe as the standard seats in that vehicle. In that way, a seat 25 can even be mounted on the cover of an engine compartment which, for repair operations, can be folded away together with the seat, if only a suitable anchorage point can be provided on the cover.

30 An embodiment of the invention will now be described, by way of an example, with reference to the accompanying drawings, in which:—

Figure 1 shows a broken-away perspective diagrammatic view of a folding bench seat with the anchoring arrangement according to the invention, 35

Figure 2 shows a view similar to that shown in Figure 1, but with the bench seat being folded together and folded away,

40 Figure 3 shows a view in cross-section through a snap lock viewing for example on to the snap lock in Figure 1 from above in a direction transversely on to the floor, and

45 Figure 4 is a diagrammatic, partly broken-away plan view of the snap lock without housing, viewing upwardly in Figure 3.

Figures 1 and 2 are perspective views of a part of the interior of a vehicle, showing the floor 1, the side wall member 2 with rear side window 3, and wheel arch structure 4. A folding bench seat 5 is shown, in the back of a private car or station wagon, comprising a seat portion 6 and a backrest 7. 50

The three-point belt system comprises a belt 8 which extends from a lower, outer, first anchorage point 9 (see Figure 2) over a guide fitment 10 through an opening in the cover shelf or member 11, to a belt winding device 12 secured to the upper, rear, second anchorage point. Disposed at a spacing above the first outer anchorage point 9 is the belt tongue member 13 which, when fitting the belt system, is to be connected to the belt buckle 14. The belt buckle 14 is rotatably secured to the pawl spindles or shafts 17 of a snap lock 18 by way of short connecting belts 15 and by way of 65

70 rotary plates 16. Disposed opposite the first lower, outer anchorage point 9 and the second outer anchorage point which is disposed substantially vertically thereabove, and thus the belt winding device 12, on the floor 1 of the vehicle, is the central bottom third anchorage point 19 which is shown in the form of a plate 21 with locking bracket or loop member 20. It will be appreciated that both round and other forms of locking 75 brackets or loop members and likewise also other securing devices for the locking member 20 than just a rectangular plate 21 can be used.

The snap lock 18 which is shown in greater detail in Figures 3 and 4 has a housing 22 with which it is secured to the backrest 7 of the folding seat 5, possibly by way of the pawl spindles 17. At the bottom, in the centre, the housing 22 of the snap lock 18 has an opening 23 which is of an inverted U-shaped configuration, such that the open side of the U-shape faces downwardly so that the locking bracket or loop member 20 can be at least partially accommodated in the opening 23. It is releasably latched in place by detent pawls 24 and 25 which can rotate about the pawl spindles 17. The release means 26 which is provided for that purpose is shown on the left in the sectional view of Figure 3. 85 90

In operation, the anchorage arrangement is used in the following manner: Figure 2 shows the arrangement in the inoperative condition. Shown on the floor 1 is the exposed anchorage point 19 of which only a flat locking bracket or loop member 20 projects upwardly; the member 20 does not constitute a large obstruction or an impediment to the load carrying space which is made available by folding up the seat 5, nor does it impede loading that space. The belt system is shown in the retracted condition, that is to say, the belt winding device 12 which can also be in the form of an automatic belt winder but which alternatively, in another embodiment, can also be replaced by a fixed anchorage point, in which case however the belt 8 must be of correspondingly greater length, has wound in the major part of the belt. The tongue member 13 which is carried displaceably on the belt 8 in the vicinity of the guide fitment 10 must, for the purposes of using the belt system, be inserted into the belt buckles 14 which, in the inoperative condition shown in Figure 2, hang down between the backrest 7 and the seat portion 6. They are connected by way of the short connecting belt portions 15 to the snap lock 18 which is only shown by way of indication in the view of Figure 2 for it is disposed in the inside of the backrest 7, at the bottom thereof (now being at the top in Figure 2, that is to say, in both Figures 1 and 2, in the region of the backrest pivot axis 26'). 100 105 110 115 120

In the view shown in Figure 2, the folding bench seat 5 has been both folded over about the backrest pivot axis 26', as indicated by the arrow 28, and also folded up about the fold axis 27, as indicated by the arrow 29, so that the entire bench seat 5, in the condition of being folded together, takes up a position parallel to the backrests (not 130

shown) of the front seats. That provides a substantially square or rectangular loading space in the rear part of the vehicle as shown in Figures 1 and 2.

- 5 If the folding seat 5 is to be moved into the operative position so that passengers can sit thereon, then the seat 5 is first folded down about the axis 27 in the direction indicated by the arrow 30 and then the backrest 7 is lifted up by pivoting about the backrest axis 28'. The pawl or latch devices which are usually provided in seats or bench seats are neither described nor illustrated herein. In such movements or rotary motions about the axis 27 and the axis 26 respectively, the opening 23 in the snap lock 18 is pushed over the locking bracket or loop member 20 so that the latching pawls 24 and 25 come into engagement with the locking bracket 20 in such a way that the snap lock 18 is fixedly connected to the anchorage point 19, or the locking bracket 20 thereof. That is then the condition shown in Figure 1. The user can now take the tongue member 13 to the vicinity of the belt buckle 14 by pulling belt 8 out of the belt winding device 12, and finally fit the tongue member 13 into the belt buckle 14. In an accident, forces occurring at the belt buckle 14 are transmitted by way of the connecting belt portion 15 to the snap lock or by way of the pawl spindles 17 thereof and the latching pawls 24, 25, to the locking bracket 20. Without a loading on the seat construction which can be of any desired light design, while being technically safe, the arrangement ensures satisfactory mounting of the tongue member 13 so that the occupant of the vehicle is kept safe and sound.

After unstrapping or releasing the tongue

- member 13 from the belt buckle 14, and after releasing arresting means (not shown), the seat 5 can be moved from the position shown in Figure 1 back into the position shown in Figure 2, by actuating the release lever 26 so that the latching pawls 24 and 25 come out of engagement from the locking bracket 20, whereby the snap lock 18 is released from the anchorage point.

#### 45 CLAIMS

1. An arrangement for anchoring a seat belt in relation to a folding seat in a vehicle, having an anchorage point secured to the floor of the vehicle, in which the floor anchorage point has a locking bracket to which a snap lock secured to the folding seat is releasably connected, and the belt fixing is mounted to the snap lock.
2. An arrangement as claimed in claim 1, in which the snap lock is mounted on the rear side of the backrest of the folding seat in the region of the centre of the vehicle.
3. An arrangement as claimed in claim 1 or claim 2, in which a connecting belt or cable is provided between the belt buckle and the snap lock.
4. An arrangement as claimed in any one of claims 1 to 3, in which the locking bracket is arranged in a sunk position or recessed position in the floor of the vehicle.
5. An arrangement for anchoring a seat belt in relation to a folding seat in a vehicle, having an anchorage point secured to the floor of the vehicle, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.